Proposed Replacement for Ocoee 2-Ocoee 3 Transmission Line

Introduction

This document explains the purpose and need for the proposed transmission line (TL) and the alternatives considered for analysis. It contains material that may appear in Chapters 1 and 2 of the Environmental Assessment (EA) to be prepared by Tennessee Valley Authority (TVA) and United States Department of Agriculture Forest Service, Cherokee National Forest (CNF) staff. Construction practices would follow the TVA Right-of-Way Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, and Transmission Construction Guidelines Near Streams and CNF Revised Land and Resource Management Plan (RLRMP). The TVA documents may be viewed as appendices to any of the EAs found at Internet site http://www.tva.com/environment/reports/index_archive.htm#transmission. The RLRMP may be accessed at http://www.fs.fed.us/r8/cherokee/planning2003/preview.shtml.

Purpose and Need

TVA needs a reliable TL that would effectively transmit the existing power source from Ocoee 2 Hydro Plant to Ocoee 3 Hydro Plant. TVA and CNF desire the TL to be outside the Ocoee River Gorge because this gorge is within the nation's first recognized national forest scenic byway and a TL within the gorge presents a serious safety hazard to the public and workers.

TVA's Ocoee 2 Hydro Plant is connected to the TVA electric power transmission system by a single TL. This TL is the only transmission connection for the 28 megawatts (MW) of generation from the hydro plant. The TL is about 4 miles in length and connects to the Ocoee 3 Hydro Plant switchyard. The TL, built in 1939, uses mostly steel A-frame square towers and a few wood poles. It is in very poor condition. The latest inspection showed that over 90 percent of the insulators have either paint or rust contamination, chipping, or blistering, which cause poor insulation performance. The hooks and hanger plates are more than 50 percent deteriorated for all of the structures. Of the 24 total structures, seven towers and two poles require immediate replacement. An additional seven towers will require replacement in one or two years. The conductor for this line has been broken multiple times due to ice and it needs replacement as well. The TL averages over five hours of outage per year, and this situation is expected to increase with time. The five hours of outage exceeds TVA's planning criteria of no more than two hours per year for delivery points. The generation is a valuable asset TVA relies upon to support the power system and meet peak power demands. Because the TL is the only transmission connection for the 28 MW of generation from Ocoee 2 Hydro Plant, if the TL is experiencing an outage because of a broken insulator, fallen structure, or broken conductor, the 28 MW of generation from Ocoee 2 Hydro Plant cannot be transmitted to the power system.

The Ocoee River Gorge is within the Ocoee Scenic Byway designated as a national scenic byway in 1988. This scenic byway is designated Management Prescription 7.A (scenic byway corridors) of the RLRMP. Within this management prescription, the desired condition is natural appearing views and primarily a continuous forest overstory. Human-made alterations should fit well within the character of the surrounding landscape. Any management activity should not be evident to the average visitor. Standard RX7A-13 discourages new utility corridors within scenic byways. (RLRMP, pages 114-116)

The lack of accessibility to the existing TL due to steep terrain and limited equipment space creates safety issues to workers during construction and/or maintenance activities and unplanned outages. Due to lack of accessibility and terrain, helicopters would be needed to fly materials and equipment to construction sites and to hover at the sites during work, which poses a higher safety risk to workers than traditional methods of ground construction. Also, additional hazards to the general public using U.S. Highway (US) 64 and the Ocoee River would be created by the use of helicopters. The deteriorated state of the existing energized TL poses a risk to the safety of the public.

Alternatives

TVA and CNF considered four alternatives. These consisted of Rebuild Ocoee 2-Ocoee 3 Transmission Line in Place, Build Ocoee 2-Ocoee 3 Transmission Line Using New Right-of-Way and Portions of Existing Right-of-Way, No Action, and Build New Ocoee 2-Ocoee 3 Transmission Line Using New Right-of-Way. A map is attached illustrating the locations of the alternative TL routes. TVA and CNF determined that the first two alternatives would not meet the purpose and need as explained below and therefore will not be analyzed in detail.

Alternatives Eliminated From Detailed Analysis

Alternative 1 - Rebuild Ocoee 2-Ocoee 3 Transmission Line in Place

Under this alternative, TVA would rebuild the existing TL in phases using a helicopter and ground personnel. TVA would initially replace the most severely deteriorated structures and all the hardware and insulators. In the second phase, TVA would replace structures with less severe deterioration and replace the conductor for the entire TL. In the final phase, TVA would replace the remaining structures. This alternative would take about 36 months to complete.

The availability of the 28 MW of generation for supporting peak loads would be reduced during construction of this alternative because this is the only transmission connection for the 28 MW of generation from Ocoee 2 Hydro Plant. In peak demand periods, the TL would have to be put back in operation to support the transmission system.

The majority of the TL would be constructed using helicopters due to lack of access for heavy equipment. Helicopters would be used to carry in/out materials such as structures, conductors, and necessary construction equipment (i.e., generators, augers, chain saws). A laydown yard (pole yard) would be required for worker assembly, vehicle parking, and material storage. An area south of the TL off National Forest System Roads (NFSR) 145 would be used for the pole yard, as shown on the attached map. Due to locations of the TL and pole yard, the helicopter would cross the Ocoee River and US 64 multiple times a

day during the project, exposing the general public as well as workers to this hazard. In addition, the lack of access would result in workers entering construction sites on foot, exposing them to slips, trips, and falls, and it would also hinder removal of injured workers.

The majority of the TL is located within Ocoee Scenic Byway corridor, crossing the Ocoee River six times and US 64 eight times. The TL is apparent in numerous locations to the average visitor. The linear nature of the TL does not fit well within the character of the surrounding landscape as described in the desired condition of the RLRMP (pages 114-116). Therefore, this alternative would continue the current effect on the scenic integrity of the visual resources.

Alternative 2 - Build Ocoee 2-Ocoee 3 Transmission Line Using New Right-of-Way and Portions of Existing Right-of-Way

Under this alternative, TVA would build a new TL using a helicopter and ground personnel. The TL would require new right-of-way (ROW) adjacent to or near the existing TL ROW. The TL would be approximately 4 miles long and require an additional 75-foot width or 36 acres of ROW. Construction would take about seven months. Currently, the new ROW is mostly forested. The trees would be cut, and removed if possible, before TL construction. After TL construction is complete, the current line would be removed, and the unnecessary ROW would be allowed to revert to natural conditions.

This alternative would be built in essentially the same way as Alternative 1 and therefore has the same concerns, with the following additions: Clearing the additional ROW would expose workers to steep terrain and chain saw accidents; the linear path impact would be wider until regrowth on the abandoned ROW has occurred.

Alternatives Considered in Detail

Alternative 3 - No Action

Under the No Action Alternative, TVA would not replace the TL but would continue current operations. Therefore, TVA would not reliably be able to use the 28 MW of generation from Ocoee 2 Hydro Plant.

Alternative 4 - Build New Ocoee 2-Ocoee 3 Transmission Line Using New Right-of-Way (Proposed Action)

Under this alternative TVA would build and maintain a new TL from the Ocoee 2 Hydro Plant to the Ocoee 3 Hydro Plant. The study area for this alternative was determined by considering the constraining factors of proximity to power sources, land use and land type, known natural and cultural features, and engineering suitability. The west and east boundaries of the study area were Ocoee 2 Hydro Plant and Ocoee 3 Hydro Plant, respectively. The northern boundary resulted in the south side of the Ocoee River. The southern boundary was defined by the nearest ridges, Indian Flat Ridge and Chestnut Ridge, to the hydro plants.

Within this study area, the principal criteria used in TL location selection were technical feasibility; unobtrusive road crossings; avoidance of occupied structures and other

incompatible land uses; and avoidance, wherever possible, of any natural or human-made features the TL might significantly impact.

The study area is completely within the Cherokee National Forest and contains no permanent private dwellings. The terrain is rough and steep, and the natural resource has been managed for multiple uses by CNF. A 1 inch = 1000 foot topographical map was created to show regional opportunities and constraints clearly. Other sources included CNF information such as the scenic byway corridor and map illustrating improved and unimproved NFSRs. The National Wetlands Inventory map and CNF RLRMP Management Prescriptions map were also reviewed as part of the project.

The new TL, approximately 4.66 miles in length, would be constructed using helicopters and ground personnel. The ROW would be 100 feet wide or approximately 56 acres. Once the new TL was built and connected to the TVA transmission system, the existing deteriorated Ocoee 2-Ocoee 3 TL would be removed and would revert to natural conditions. Construction would take about 11 months. The existing TL would continue in current operations during the construction of the new TL. The following sections explain how the TL would be constructed, operated, and maintained, and how the existing TL would be removed after construction.

Construction

Right-of-Way Acquisition and Clearing

TVA would obtain a special use permit for the TL ROW, 100 feet wide by approximately 4.66 miles long, from the CNF. The special use permit would give TVA the right to construct, operate, and maintain the TL, as well as remove danger trees off the ROW. Danger trees are those trees that are located away from the cleared ROW, but are tall enough to pass within 5 feet of a conductor or strike a structure should it fall toward the TL.

Because of the need to maintain adequate clearance between tall vegetation and TL conductors, as well as to provide access for construction equipment, most trees and shrubs would be initially removed from the entire width of the ROW. Equipment used during this ROW clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. Marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled and burned, chipped, or taken off site. In some instances, vegetation may be windrowed along the edge of the ROW to serve as sediment barriers. Vegetation removal in streamside management zones (SMZs) and wetlands would be restricted to trees tall enough, or with the potential soon to grow tall enough, to interfere with conductors. Clearing in SMZs would be accomplished using hand-held equipment or remote-handling equipment, such as a feller-buncher, in order to limit ground disturbance. TVA Right-of-Way Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, and Transmission Construction Guidelines Near Streams and/or the RLRMP would be followed in clearing and construction activities.

After clearing and construction, the ROW would be planted with native warm season grasses where suitable. Nonsuitable areas would be restored following TVA and/or CNF

standard guidelines. Erosion controls would remain in place until the plant communities were fully established. (TVA Right-of-Way Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, Transmission Construction Guidelines Near Streams, and/or the RLRMP)

Access Roads

Existing NFSRs and abandoned roads along the proposed TL would be used to allow vehicle access to each structure and other points along the ROW. Access roads used for the TL are located on the ROW wherever possible and are designed to avoid severe slope conditions and to minimize stream crossings. Access roads are typically about 20 feet wide and are surfaced with dirt or gravel. Four roads shown in the map may need upgrading and removal of overgrown vegetation but no new excavation. This work would be done in accordance with the requirements of the RLRMP.

Culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any permanent streams would be removed following construction. However, in wet-weather conveyances, they would be left or removed, depending on the RLRMP standards that might apply. (TVA Right-of-Way Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, Transmission Construction Guidelines Near Streams, and/or the RLRMP)

Pole Yard

As with Alternatives 1 and 2, an area south of the TL off NFSR 145 would be used for the pole yard. (See the attached map.) This site would be used for the duration of the 11-month construction period, plus approximately one additional month for initial storage and final removal of material. The site, containing one dead tree and underbrush, would be cleared before storage begins. High traffic areas would be graveled. Following the completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. The pole yard would be restored using native warm season grasses according to RLRMP guidelines.

Structures and Conductors

The proposed TL would use mostly double pole (H-frame) structures. (Such a structure is shown in the foreground of Figure 1). Structure heights would vary according to the terrain and would range between 55 and 125 feet, averaging 80 feet.

Figure 1. H-Frame Transmission Structures

Three conductors (the cables that carry the electrical current) are required to make up a circuit in alternating current TLs. Each conductor is made up of a single cable. The conductors are attached to fiberglass or ceramic insulators suspended from the structure cross arms. A smaller overhead ground wire is attached to the top of the structures. This ground wire may contain fiber optic communication cables.

Poles at angles in the TL may require supporting guy wires. Some structures for larger angles could require two or three poles. Most poles would be imbedded directly in holes augered into the ground to a depth equal to 10 percent of the pole's length plus an additional 2 feet. The holes would normally be backfilled with the excavated material. In some cases, gravel or a cement and gravel mixture might be necessary. A crane would be used to place the structure in the hole. A crane pad, approximately 40 feet by 40 feet, would be prepared if ground near the structure location is not level.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (e.g., areas with soft ground) to reduce the potential for environmental impacts. In addition, a helicopter would be used for installing seven structures because of the terrain and no easy access into locations.

Conductor and Ground Wire Installation

Reels of conductor and ground wire would be delivered to various staging areas along the ROW, and temporary clearance poles would be installed at road and railroad crossings to reduce interference with traffic. Installation of conductors would begin with a small rope being pulled from structure to structure. This rope would then be connected to the conductor and ground wire and used to pull them down the line through pulleys suspended from the insulators mounted on the structures. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Finally, the wires would be clamped to the insulators and the pulleys removed.

Operation and Maintenance

Inspection

Periodic inspections of TVA's TLs are performed from the ground and by aerial surveillance using a helicopter. These inspections, which occur on approximately five-year cycles after operation begins, are conducted to locate damaged conductors, insulators, or structures, and to report any abnormal conditions that might hamper the normal operation of the line or adversely impact the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance or routine vegetation management in coordination with the CNF.

Vegetation Management

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between TL conductors and vegetation. The TL would be designed to meet a 24-foot minimum clearance as required by the National Electric Safety Code.

Management of vegetation along the ROW would consist of two different activities: namely, the felling of danger trees adjacent to the cleared ROW and the control of vegetation within the cleared ROW.

Management of vegetation within the cleared ROW would use an integrated vegetation-management approach designed to encourage the low-growing plant species and discourage tall-growing plant species. A vegetation-reclearing plan would be developed in consultation with CNF for each TL segment based on the results of the periodic inspections described above, abiding by the RLRMP. The two principal management techniques are mechanical mowing, using tractor-mounted rotary mowers, and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical mowing is not practical. Herbicides would be selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers. Any herbicides used would be applied in accordance with applicable state and federal laws and regulations and the commitments listed in the EA. Only herbicides registered with the U.S. Environmental Protection Agency and in compliance with the RLRMP and Vegetation Management Environmental Impact Statement, as amended would be used. Herbicides to be used would be:

Glyphosate This chemical is commonly found in brand name products such as Roundup, Accord, and Rodeo. Glyphosate is a broad-spectrum herbicide used to kill grasses and broadleaf weeds. Rodeo is a formulation labeled for aquatic use.

Imazapyr This chemical is commonly found in brand name products such as Arsenal and Habitat. Imazapyr is commonly tank-mixed with other products to ensure control of undesirable vegetation.

Fosamine Ammonium This product is commonly found in brand name products such as Krenite S and is a brush-control agent.

Metsulfuron Methyl This chemical is found in the product Escort, which controls broadleaf weeds and brush.

Triclopyr This chemical is found in brand name products such as Garlon 3A and Garlon 4. Triclopyr is most effective on broad-leaved plants and is used for noxious weed control such as kudzu, planting site preparation, and release of tree seedlings from competition.

Clopyralid This chemical is found in brand name products such as Transline. Clopyralid is very effective against kudzu, but most trees and grasses are tolerant of it. It may be used for wildlife opening maintenance, planting site preparation, and release of tree seedlings.

Other than vegetation management, little maintenance work would normally be required. The TL structures and other components typically last several decades. In the event that a structure must be replaced, the structure would normally be lifted out of the ground by crane-like equipment and the replacement structure inserted into the same hole or an immediately adjacent hole. Access to the structures would be on existing roads where possible. Replacement of structures may require leveling the area surrounding the replaced structures, but there would be little, if any, additional area disturbance when compared to the initial installation of the structure.

Removal of the Existing Transmission Line

The existing Ocoee 2-Ocoee 3 69-kilovolt TL would be removed once the new line is in operation, and the ROW would be allowed to revert to its natural state. The conductor would be removed from the insulators and reeled onto a reel. The hardware would be removed from each structure and be removed from site using vehicle or helicopter. Each structure would be cut below grade and removed from site using vehicle or helicopter. The scrap material would be recycled. All removal activities would be conducted according to RLRMP guidelines.